



pennsylvania
DEPARTMENT OF ENVIRONMENTAL
PROTECTION

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MEMO

TO Heather Henry
Air Quality Program
Southeast Regional Office

FROM William Schneider *RPS for WS*
Source Testing Section

THROUGH Charles Zadakis *CJ*
Environmental Program Manager
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Environmental Group Manager
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DATE December 22, 2016

RE Source Test Review
Monroe Energy, LLC
Main Flare (Source ID 103)
Sour Gas Flare (Source ID-121)
Trainer Borough, Delaware County
TitleV Operating Permit No. 23-00003
eFACTS: 2260760 PFID: 293037
eFACTS Inspection Result: NOVIO

MESSAGE:

Monroe Energy operates or operated the following two flares at its refinery:

1. The steam-assisted Main Flare controlling waste gases sent to this flare from numerous refinery processes, with a major source of these waste gases being emergency releases from safety pressure relief valves, with other sources sent to this flare as discussed in the Weston 2014 emission test report for the flare testing. The waste gases are sent for collection to one of three flare headers (North, Alkylolation and Southside), before being collected in the main header and then are sent to a large moisture knockout drum, prior to being sent to the flare. There is also the Lowline flow, which is collected by the Southside flow, prior to the Southside flare header.
2. The Sour Gas Flare, which was permanently decommissioned on December 9, 2015, as indicated to me by Heather Henry. This flare controlled exhaust gases from the Sour Gas piping, the Sour Gas purge tank vent piping (after being treated with an amine vent gas absorber to remove hydrogen sulfide) and the derrick from the Sulfur Plant incinerator. There was a drip-pot at the base of this flare, which would presumably allow moisture to drop out from flows entering at the base of the

stream location would be above the 200 Btu/scf minimum allowable, primarily due to 5.40% reported in the C6 plus category for that sample, compared to a range of 1.06 to 1.41% in the C6 plus category for the Weston test samples). On the other hand, the facility's Sweep Gas analysis in the test report indicated it contained no nitrogen, with the large majority of the sweep gas being hydrogen (approximately 82% by molar volume), with the remainder largely consisting of hydrocarbons.

To the above e-mail, I indicated by a February 24, 2014 e-mail to the facility and Weston representatives that they had two options: (a) submit a revised protocol for testing the Sour Gas flare or (b) submit the above procedure in the test report and we would see if we could approve this procedure. If option (b) was chosen, I indicated the test report needed to include certain information concerning the facility sweep gas, such as time of collection, how it was collected and QA/QC information regarding the analysis. The facility chose option (b).

Conclusions

All Main and Sour Gas Flare tests were conducted in accordance with a pre-approved test protocol with the exception noted above concerning the Sour Gas Flare Btu analysis. Note that there were some modifications to the original protocols as noted in the December, 2014 conditional approval letter for this testing. All tests are acceptable to the Department as a credible representation of the actual results (velocity, Btu/scf and fugitive emissions) under the operating conditions during testing and may be used for compliance purposes, with the following comment noted for what purposes the Sour Gas Btu/scf results should be utilized:

1. The test report indicated only one facility sweep gas sample is collected per each week and that sample was collected on January 15, 2014 or five days prior to testing of the Sour Gas Flare. There was no indication in the test report, concerning the length of time the sample was collected, compared to the three-one hour samples collected by Weston at the CEM slip stream location. If I was familiar with this procedure prior to testing, I would have discussed the possibility with the facility and consultant of collecting a one hour sweep gas sample per test run, simultaneously with the three one-hour samples collected by Weston. As the final weighted Btu content for the Sour Gas Flare of 621 Btu/scf is well above the 200 Btu/scf minimum for this source, it is likely that this flare was meeting the minimum Btu/scf allowable and hence, these Btu/scf test results are acceptable for demonstrating compliance with the Btu/scf allowable. However, those test results should not be used for any other purposes. If this source was still active, I would have recommended for future testing, for most accuracy, there should be either (a) one hour samples taken simultaneously per test run from each stream or (b) better, if practical, a modification of this source, so that one inlet sample could be collected at a suitable length after the mixing of the two streams.

The following results were extracted from the test report:

weighted average was determined by using the Weston and the facility's samples' Btu content with their weighted fraction of the total flow (0.0907 for the vent gas and 0.903 for the sweep gas).

Process Data (more details in the test report):

There is detailed data in each test report, which includes: (a) for the Main Flare, the volumetric flow rates for each flare header (test run averages are shown in the table on the preceding page), as well as the temperature of each flare header and flare temperature (the average for each test run was 474, 569, 339°F, respectively) and steam rates and (b) for the Sour Gas Flare, the volumetric flow rates (the test run averages are shown in the table on the preceding page) and flare temperature (the average for each test run was 1670, 1685, 1691°F, respectively). The test reports include the laboratory analysis that was used to determine the Btu content of each flare's inlet for each test run by using weighted mole fractions of each determined compound in conjunction with that compound's Btu content (C1 through C6 hydrocarbons, carbon monoxide, carbon dioxide, oxygen, hydrogen and nitrogen).

cc: Reading File, Source Testing Section
EPA/AKB
AKB/AIMS

CJZ: RPS: JDP: WMS: wms